CLAIMS:

1. A display device (101) comprising:

a display element (118);

a medium capable, upon imposition of a sequence of one or more potential differences, of changing its optical state from a first optical state to one of at least four second optical states, the at least four second optical states including the first optical state;

a pixel electrode (105) and a counter electrode (106) associated the display element (118) and receiving the sequence of one or more potential differences; and

a controller (215) configured to determine and control the sequence of one or more potential differences imposed on the display element (118),

the at least four optical states comprising two extreme optical states and at least two intermediate optical states,

the particles (108, 109) being at an extreme position when the display element (118) is in one of the extreme optical states, the particles (108, 109) being at an intermediate position when the display element (118) is in one of the intermediate optical states,

the sequence of one or more potential differences comprising a reset portion for enabling a change in the optical state of the display element to one of the extreme positions, and a driving portion for enabling a change in the optical state of the display element to one of the at least four optical states,

the reset portion further comprising a standard reset portion and an over-reset potential difference,

the controller (215) being further arranged to apply the reset portion to the display element (118), the standard reset portion applied being adjusted according to a distance that the particles (108, 109) in the medium move in order to achieve one of the two extreme optical states and to apply the driving portion to the display element (118) to move the particles (108, 109) to a desired one of the intermediate optical states from one of the extreme optical states.

2. The display device (101) of claim 1, wherein the value of the over-reset potential difference applied to the display element is the same for each change in the optical state of the display element (118) to one of the at least four optical states.

3. The display device (101) of claim 2, wherein the sequence of potential differences has the same duration for each change of optical state of the display element from a first optical state to one of the at least four second optical states.

4. The display device of claim 3, wherein the distance is less than a maximum distance that particles (108, 109) in the medium can move in order to achieve one of the two extreme optical states, and the sequence of potential differences includes one or more short sequences (849, 850, 851) of additional shaking pulses of potential difference.

5. The display device (101) of claim 1, wherein the value of the over-reset potential difference applied to the display element for each change in the optical state of the display element to one of the at least four optical states is chosen without regard to the standard reset portion.

6. The display device (101) of claim 1, wherein the sequence of potential differences comprises a first set of shaking pulses and a second set of shaking pulses.

7. The display device (101) of claim 6, wherein the first set of shaking pulses is before the reset potential difference and the second set of shaking pulses is after the reset potential difference and before the driving potential difference.

8. The display device (101) of claim 1, wherein the standard reset portion is determined without reference to the other portions of the sequence of one or more potential differences.

9. The display device (101) of claim 1, wherein the over-reset potential difference and the driving portion are varied to bring the potential difference applied

to the display element (118) over a time period to an average value substantially equal to zero.

10. The display device (101) of claim 9, wherein the over-reset potential difference and the driving portion are varied by offsetting a larger change in the duration over which the over-reset potential difference is applied with a smaller variation added to the potential difference applied during the driving portion.

11. The display device (101) of claim 10, wherein the smaller variation is less than or equal to 25% of the larger change.

12. A method for updating an image on a bi-stable display, the method comprising:

determining a standard reset potential difference to be applied to a display element (118) of the display taking into account a distance that particles (108, 109) of the bi-stable display must move to reach an extreme optical state of the display element (118);

applying the standard reset potential difference to a display element (118) of the bi-stable display,

applying an over-reset potential difference to the display element (118); and

applying a driving potential difference to the display element (118) corresponding to a desired optical state of the display element (118).

13. The method of claim 12, wherein: the over-reset potential difference is the same for each change of the optical state of the display element (118) to one of a plurality of desired optical states of the display element (118).

14. The method of claim 13, wherein: the standard reset duration is proportional to the distance that particles (108, 109) of the bi-stable display must move to reach an extreme optical state of the display element (118).

15. The method of claim 12, comprising applying a first series of shaking pulses (540) to the display element (118), the ending point of the first series of shaking pulses (540) being temporally adjacent to a starting point of the application of the standard reset potential difference.

16. The method of claim 12, comprising applying additional shaking pulses (849, 850, 851) in short sequences (846, 847, 848) accommodated in a duration over which the standard reset potential difference would be applied, but for the standard reset potential difference's taking into account the distance.

17. A program storage device tangibly embodying a program of instructions executable by a machine to perform a method for updating an image on a bi-stable display, the method comprising:

determining a standard reset potential difference to be applied to a display element (118) of the display taking into account a distance that particles (108, 109) of the bi-stable display must move to reach an extreme optical state of the display element (118);

applying the standard reset potential difference to a display element (118) of the bi-stable display,

applying an over-reset potential difference to the display element (118); and

applying a .driving potential difference to the display element (118) corresponding to a desired optical state of the display element (118).